solution upon the lines indicated, there is no reason beyond that of expense why vision should not be electrically extended over long distances. The only method which can be regarded as feasible (unless, indeed, M. Armengaud has made a revolutionary discovery) is that suggested by the structure of the eye itself; the essential condition is that every unit area of the transmitter screen should be in permanent and independent connection with the corresponding unit of the receiving screen. This idea would naturally present itself to anyone approaching the subject for the first time, but would probably be rejected in favour of something apparently more simple. Such an apparatus could, however, be constructed without any serious complexity apart from that arising from the mere multiplication of its components. I have made a rough estimate of the cost, assuming the stations to be 100 miles apart, the received picture to be 2 inches square, and the length of a unit to be 1/150 inch. Of each of the elementary working parts—selenium cells, luminosity-controlling devices, projection lenses for the receiver, and conducting wires—there would be 90,000. The selenium cells would be fixed on a surface about 8 feet square, upon which the picture would be projected by an achromatic lens (not necessarily of high quality) of 3 feet aperture. The receiving apparatus would occupy a space of about 4000 cubic feet, and the cable connecting the stations would have a diameter of 8 or 10 inches. The thing could probably be done for 1,250,000*l.*, but not for much less. By an application of the three-colour principle it would be possible to present the picture in natural colours, like that shown upon the focussing screen of a camera. The cost would in that case be multiplied by three.

SHELFORD BIDWELL.

ARISTOTLE AND NATURAL SELECTION.

A PASSAGE of Aristotle's "Physics," in which he alludes to the theory of natural selection, has been frequently quoted and almost as frequently misinterpreted. It may therefore be worth while to devote a short space to a careful consideration of its import.

The passage in question is in the "Physica Auscultatio," ii., 8, §§ 1–6. In it Aristotle begins by asserting the existence in nature of final causes (*ἕνεκά του αἰτίαι*). He next considers objections that may be brought against this view, as, for example, that rain falls simply in obedience to natural law (*ἐξ ἀνάγκης*) and not for the sake either of making the corn grow or of spoiling it when cut. So, too, the supposed objector proceeds, with the parts or organs of animals; what is to prevent us from saying that the teeth originate in their various forms of incisors and molars simply by the operation of natural law? That they are serviceable respectively for cutting and grinding is not purposeful, but coincidental (*οὐ τούτου ἕνεκα γενέσθαι, ἀλλὰ συμπεσεῖν*). The existence of these apparent adaptations, the objector adds, can be accounted for by the fact that, as Empedocles has pointed out, those organisms that are unfitted for their conditions do not survive, but perish.

It will be seen from the foregoing that Aristotle does not advance the theory of natural selection as part of his own explanation of adaptation in nature, but as a principle that might be used to reinforce an alternative view.

We may now turn to his answer. The objection, he replies, will not hold, because things that arise naturally (*φύσει*) always, or nearly always, come about thus; *i.e.*, like the teeth, already adapted and fit to survive; while beings such as the unadapted monsters imagined by Empedocles originate, if at all, by chance or spontaneously (*ἀπὸ τύχης καὶ του αὐτομάτου*), and are, Aristotle would say, outside the ordinarily observed course of nature. It cannot be alleged, he goes on to point out, that such phenomena as rain and warm weather are altogether dependent on chance or coincidence (*ἀπὸ τύχης οὐδ' ἀπὸ συμπτώματος*). Warm weather is the rule in the dog-days, and rain in winter. Everyone admits that things of this kind are in accordance with the ordinary course of nature; and if they occur in this regular way neither of themselves (like monsters) nor by mere coincidence (like unseasonable rain) it remains that they must exist for some purpose (*ταῦτ' ἕνεκά του ἂν εἴη*). It must then be concluded that final causes exist in reference to natural products (*ἔστιν ἄρα τὸ ἕνεκά του ἐν τοῖς φύσει γιγνομένοις καὶ οὖσιν*).

Whatever may be thought of Aristotle's argument, it is clear that his general object throughout this passage is to defend his doctrine of final causes (it is to be observed that he does not say that final causes are of universal operation). He is unable to fall in with the view of natural selection as propounded by Empedocles, because, as it appears to him, adaptations are produced ready-made; the non-adapted is not merely eliminated, but seldom comes into existence at all. He seems, however, to admit that for those who believe (as he does not) in a purely fortuitous origin of natural objects, the hypothesis of natural selection affords a feasible explanation of adapted structures.

The erroneous views that have been taken of this passage by various writers have been due, I think, to the general failure to recognise that the whole of sections 2, 3 and 4 are devoted to Aristotle's statement of a possible objection to his own opinion. Thus Gomperz ("Griechische Denker," xiv., pp. 103, 104; Leipzig, 1908), although he clearly states Aristotle's position with regard to the Empedoclean monsters, nevertheless quotes the sentence about the rain and the growing corn as if it gave Aristotle's own explanation instead of the plea of an opponent. Osborn ("From the Greeks to Darwin") falls into the same error; the author of a pamphlet (Αἱ *τῶν* Lamarck *καὶ* Darwin Θεωρίαι *παρὰ τῷ* 'Αριστοτέλει), lately published at Athens, has similarly missed the point; nor has Darwin himself escaped the like misapprehension, for which probably the translator on whom he relied was responsible ("Origin of Species," note to "Historical Sketch" in the later editions). On the other hand, the general drift of the passage was rightly appreciated by G. H. Lewes, though the confusion of ideas with which he taxes it belonged, perhaps, rather to his own mind than to that of Aristotle.

F. A. DIXEY.

NOTES.

WE notice with deep regret that Sir John Evans, K.C.B., F.R.S., died at his residence, Britwell, Berkhampsted, on Sunday, May 31, in his eighty-fifth year.

SIR GEORGE DARWIN, K.C.B., F.R.S., and Prof. E. B. Tylor, F.R.S., have been elected corresponding members of the Vienna Academy of Sciences.

THE twenty-fourth Congress of the Royal Sanitary Institute will be held at Cardiff on July 13–18, under the presidency of the Earl of Plymouth. In addition to sectional meetings, there will be a number of conferences on various aspects of sanitary science, among the subjects being spring cleaning and its sanitary significance, and the sorting and grouping of school children for educational purposes.

WE learn from the *Times* correspondent at St. Petersburg that on Monday, June 1, the Grand Duke Michael opened the International Congress on Navigation, which is being held for the first time in St. Petersburg. Three thousand delegates from all countries have assembled, including Sir John Murray, K.C.B., F.R.S. Regret is expressed by the organisers of the congress at the small representation of Great Britain.

UNDER the direction of Prof. Loomis, an exploring party will leave Amherst College, Mass., on June 12 to work in the western States. The party will first examine the Indian quarries in Converse County in search of stone implements, and will then look for horse, camel, and rhinoceros bones in the Lower Miocene in Nebraska. The party will then go southwards to the Upper Miocene of north-eastern Colorado, where it is expected to find the later stages of the same groups of animals. Prof. Lull, of the Yale Museum, will probably camp with this party, but will make an independent collection.

THE death is reported, in his fifty-seventh year, of Prof. Leslie Alexander Lee, who held the chair of biology in Bowdoin College, Maine, since 1876. In 1887 he was chief of the scientific staff on the voyage of the U.S. Fish Commission's steamer *Albatross* through the Strait of Magellan. The results of his work on this expedition were preserved in a large number of biological, geological, and ethnological memoirs published by the Smithsonian Institution. He was also director of the Bowdoin expedition to Labrador in 1891, when large collections were made, and the Grand Falls, 316 feet high, were rediscovered.

ON May 15 there was held in Cracow, at the Academy of Sciences, a celebration of the twenty-fifth anniversary of Prof. Olszewski's work on the liquefaction of gases, his first researches in that direction having been commenced during the spring of 1883 with the late Prof. Wróblewski. The celebration was an unofficial one, and only the members of the mathematical and natural history class of the academy took part in it. The president of the academy, Prof. Count Tarnowski, congratulated Prof. Olszewski in an address, after which an album containing photos of the members of the mathematical and natural history class was presented to him. As the intention of the academy to celebrate the work of its distinguished member was not publicly made known, only a few letters and telegrams reached him, including those of several learned societies in Warsaw and of the professors of chemistry and of physics in the University of Fribourg.

A POLL has just been taken by the Geological Society to ascertain the opinion of the fellows resident in the United Kingdom as to the admission of women to the society. The number of voting papers sent out was 870, and 477 replies were received. An analysis of the votes shows that 248 fellows were in favour of the admission of women as fellows and 217 against their admission, but of this number only 133 voted against the admission of women at all, the remaining eighty-four being in favour of their admission as associates. The fact that there was a majority of thirty-one in favour of the admission of women as fellows should be an encouraging sign to the increasing number of women who are taking up scientific work and in other ways contributing to the extension of natural knowledge.

THE council of the Institution of Civil Engineers proposes to award annually a prize, of the value of about 33*l*., to be called the Indian premium, to the author, being a corporate member of the institution in practice in India, of the best paper received during the year on a subject connected with Indian engineering. The council further proposes that the income of a legacy of 1000*l*. bequeathed by the late Mr. L. F. Vernon-Harcourt to the institution be applied, in general accordance with the testator's wishes, to provide for a biennial lecture on some subject relating to rivers, canals, or maritime engineering, to be delivered before meetings of students of the institution in London and before such of the provincial associations of students as the council may determine from time to time. The council recently accepted, on behalf of the institution, a legacy of 1000*l*., bequeathed by the late Mr. F. W. Webb, to be applied to establish a "Webb prize" for the best paper submitted to the institution on railway machinery, or upon some branch of railway machinery which may be prescribed.

THE thirteenth annual congress of the South-eastern Union of Scientific Societies will be held at Hastings on June 10–13 under the presidency of Sir Archibald Geikie, K.C.B., Sec.R.S., who will give his presidential address at the Royal Concert Hall, St. Leonards, on Wednesday, June 10, at 8 p.m. Papers are promised by Mr. E. A. Martin, on some considerations concerning dew-ponds; Messrs. Ruskin Butterfield and W. H. Bennett, a contribution to the spider fauna of the district round Hastings; Mr. W. H. Mullens, Gilbert White and Sussex; Mr. Edward Connold, local sponges; Mr. J. E. Ray, mediæval timbered houses of Sussex and Kent; Mr. Wintour F. Gwinnell, the reptile monsters of Mesozoic times, with especial reference to the iguanodon; Mr. Lewis Abbott, Pleistocene vertebrates of the south-east of England; Mr. W. M. Webb, Darwinism as applied to dress. There will be a loan museum under the superintendence of Mr. E. W. Swanton. Excursions, geological or antiquarian, will take place to Hastings Castle and Caves, and the salient physical features of the district, Battle Abbey, Rye, Bodiam Castle, and Dungeness. The local secretary is Mr. W. Ruskin Butterfield, Corporation Museum, Hastings, from whom tickets and all information can be obtained.

CAPTAIN EJNAR MIKKELSEN has returned, we learn from the *Times*, to Copenhagen after his two years' sojourn in the regions north of Alaska. The chief object of the expedition was to decide whether there is land to the north of Alaska or a deep sea. Captain Mikkelsen's ship arrived on September 17, 1906, at Flaxman Island, where she was soon frozen in. The whole of that autumn was spent in mapping the surrounding country and observing the tide. About forty miles from the coast the party found mountains from 10,000 feet to 12,000 feet in height, hitherto not marked on any map, and Mr. Leffingwell, the companion of Mr. Mikkelsen, undertook some geological researches. In March, 1907, Captain Mikkelsen, Mr. Leffingwell, and the mate started in three sledges with eighteen dogs on a trip over the ice towards the north. The thermometer showed −56° C.; nevertheless, they often came across big crevices among the ice floes. About fifty miles from shore they found water which they sounded to the depth of 800 metres without reaching bottom. Sixty miles further on no change was recorded, until at last, turning towards the south-east, they found bottom. They followed this edge of the continental shelf towards the east, but had soon to return owing to the strong current. Captain Mikkelsen was thus able to prove that deep water exists north of Alaska to a great distance.

ON May 31, in Rome, M. Delagrange made successful experiments with his aëroplane. According to the *Times* correspondent, at the request of M. Delagrange the Italian Society of Aviation prepared the ground in the Piazza d'Armi for an officially authenticated trial. The Piazza was marked with flags, the four sides measuring in all 1300 metres. At 5.40 a.m. M. Delagrange set his machine going. The aëroplane ran for fourteen seconds, and then rose easily, remaining in the air for the whole of the rest of the flight, and keeping a distance from the ground varying between three and five metres. The actual flight lasted for 15m. 26s., and during that time the aëroplane made the circuit of the marked course 9¾ times. The actual distance travelled, measured by the milometer of an automobile, which naturally took closer curves than the aëroplane, was more than 15 kilometres, or there was a flight through the air without touching ground of 15 kilometres in something more than 15 minutes. M. Delagrange steered and controlled the aëroplane with ease, and could have continued the flight if the power of the engine had permitted. The problem of stability has still to be solved; M. Voisin, who made the aëroplane, hopes to overcome instability by increasing the number of planes. Other trials were made in the evening, in one of which M. Delagrange travelled five times round the Piazza in six minutes at a height of between five and six metres. On June 1 a final trial was made in the presence of the Queen-Mother. In preventing a possible collision with the Royal stands, M. Delagrange stopped the aëroplane too suddenly, and it fell from a height of about four metres to the ground. The aëronaut was unhurt, but the aëroplane sustained slight damage.

JUST now, when consideration is being given to a proposal to effect an arrangement which shall ensure the utilisation of a larger number of hours of daylight in the summer time, it is not without interest to direct attention to a paper, which Mr. G. V. Hudson read before the New Zealand Institute in 1898, a copy of which the author has forwarded to us. The scheme differs from that now before a committee of the House of Commons in being of a more drastic character, and being free from the frequent irritating interferences with the regular record of time, which is one of the most objectionable features of the present Bill. Writing for the southern hemisphere, it was proposed to put the clock forward two hours on the first of October, and to put it back the same amount in the following March. Here the scheme has the merit of boldness, and if any breach in continuous time reckoning is to be tolerated, it may be excused on the ground that a considerable advantage is promised. In the paper are discussed the advantages and many of the objections with which we have become familiar from the evidence that has been given before the Parliamentary Committee, and sufficiently reported in the daily Press. There is no necessity to discuss these either as they appear in the original pamphlet or in a more modern dress. To substitute mid-European time as some of the witnesses have suggested is a noticeable improvement on the original plan, and one that would meet many objections. But, notwithstanding the amendment, it may be pointed out that, since the Bill does not contemplate any alteration of time as employed in navigation and nautical matters, one can conceive that in seaport towns, where the influence of shipping makes itself felt in the general conduct of business, very considerable confusion can arise. For instance, in most seaport towns a time signal is used for the convenience of vessels in port. That signal is also valuable to the public, and serves to regulate time. It seems that under the Bill the interests of one party must be sacrificed. Either the seaman or the public loses the time signal. It is easy to say that is a mere detail, but the whole objection to the scheme turns on details, and the final acceptance or rejection of the Bill will depend on the importance that details may acquire by accumulation.

THE Alliance Franco-Britannique, Littéraire, Scientifique, et Artistique, held a conversazione at the Grafton Galleries, Grafton Street, London, on May 28, in the course of which M. Yves Guyot delivered a lecture on "Les Rapports Intellectuels de la France et de l'Angleterre." Sir Archibald Geikie, K.C.B., F.R.S., chairman of the council, introduced the lecturer. Referring to French and English science, M. Yves Guyot said, from the point of view of pure science, the English have changed the French system of natural science completely. In France the theocratical conceptions of Cuvier's "Révolutions du Globe" were still held when in 1830–3 Charles Lyell substituted for them the real and conclusive theory of "actual causes." The Frenchmen Lamarck and St. Hilaire had anticipated evolution, but when in 1858 Darwin expounded the theory of the struggle of life he brought about a total transformation in the study of biology. Herbert Spencer boasted of having given a systematic explanation of the universe, and of having propounded the conditions of evolution. Almost all his works have been translated into French, and they have continued to exercise upon French thought the beneficent influence which all English thinkers since Locke have had over it. Almost all Frenchmen are sons of Plato, who are apt to take words for deeds. University literary teaching in France has encouraged this tendency. This method of procedure allows scope, on one hand, for all the subtleties of scholasticism, and on the other for all the literary and oratorical explanations which hide the emptiness of the idea under assertions and metaphors. The English mistrust generalisations, and make a constant appeal to facts. They have the primary qualification for all scientific research—honesty. They do not try to dazzle by sophistry; their objective is truth, and by their example they force the men of research in all countries to subordinate all other considerations to this end. Not only have they enriched the world with the experimental method, but they make everyone practise it conscientiously. Hence it is easy to recognise in France those authors, professors, publicists, and *savants* who have come under English influence. Later, M. Yves Guyot remarked that among the useful forms under which English influence has been exerted upon the French intellect, the first is scientific. Bacon against Plato, Newton against Descartes, Lyell against Cuvier; the movement was continued through Darwin and Herbert Spencer. It was confirmed also by Adam Smith. It is the inductive method as opposed to intuitive conceptions. It is reality opposed to the assertions and subtleties taught by the Greek sophists.

FROM the East Kent Scientific and Natural History Society we have to acknowledge the receipt of a copy of the report and transactions for 1907.

FISHES of the Rocky Mountain region form the subject of the only zoological paper—by Prof. T. D. A. Cockerell—in No. 3 of the fifth volume of the University of Colorado Studies. Extinct as well as living species are discussed, and it is pointed out that the contrast between the generic types respectively characteristic of the Gila and the Rio Grande basins suggests re-consideration of the theory of a recent depression of the continent in the region of southern New Mexico and Arizona.

THE second part of vol. xx. of the Proceedings of the Royal Society of Victoria contains two papers on the geology and palæontology of that colony, Prof. E. W. Skeats discussing the Palæozoic strata of Mooroodue, in the Mornington peninsula, while Mr. F. Chapman describes a number of new or little-known Victorian fossils. The same issue contains the first part of a paper by Miss Georgina Sweet on the anatomy of certain Australian amphibians, of which we have been favoured by the author with a separate copy.

To the May number of the Zoologist Mr. Charles Oldham contributes a paper on the birds frequenting the well-known "gullery" at Ravenglass, on the Cumberland coast. The most notable species nesting there are the black-headed gull and the common and the Sandwich tern, of which the last-named is more numerously represented than in any other of its few English breeding-places. The Sandwich terns breed in colonies of from five or six to fifty or more pairs. These colonies, often at some distance from one another, are chiefly in the southern part of the gullery, and most frequently on the dunes next the sea or the estuary. There the nests are grouped within a few inches of one another, sometimes hard by those of the common terns and the black-headed gulls. Unlike those of the latter, the nests are never in thick herbage, but take the form of mere shallow depressions, with or without a lining of bents, amid the sparse marram-grass.

THE first part of the third volume of the Journal of the Federated Malay States Museum is devoted to an account of the exploring expedition to Gunong Tahan, the great mountain to the northward of Pahang, undertaken in 1905 by Messrs. Wray and Robinson, followed by descriptions of the zoological collections. The narrative, which is illustrated by reproductions of photographs of the general scenery and the vegetation, shows that the explorers had to undergo some rough experiences, although the admirable arrangements made by the authorities in the matters of supply and carriage prevented the occurrence of any difficulties. The collections, so far at any rate as vertebrates are concerned, proved, perhaps, a little disappointing. The new mammals, for example, comprised only a couple of squirrels, one of which is merely a subspecies, and a bat, albeit of a rather rarely represented genus, while of new birds there were seven, among which a woodpecker (Gecinus), an owl (Heteroscops), and a Cissa are, like one of the squirrels, illustrated in coloured plates.

THE sensory reactions of the lancelet are discussed by Mr. G. H. Parker in vol. xliii., No. 16, of the Proceedings of the American Academy of Arts and Sciences. The creature, it seems, is but very slightly receptive to light, responding, indeed, to a rapid increase of illumination, but taking scarcely any notice of a corresponding decrease; the only known light-receiving organs are the eye-cups in the wall of the nerve-tube. Temperatures below 5° C. and above 39° C. are fatal to its existence. Mechanical stimulants affect the skin, more especially the tentacles and oral hood, and sound-vibrations likewise produce an effect on the organism. Tactile organs exist in the skin, but there are no derived structures corresponding to ears and the lateral line of fishes. To locomotion-inducing stimulants the lancelet responds by forward movements when these are applied to the tail, and by backward movements when they touch the middle or fore-part of the body. The creature generally buries itself tail-first in the sand, and probably swims in a similar manner, although in both cases the movement may be reversed.

To the May number of the *American Journal of Science* Mr. R. S. Lull contributes an interesting paper on the head-muscles of dinosaurs, with special relation to the origin of the neck-shield in the horned group (Ceratopsia). Such evidence as can be obtained with regard to the cranial musculature can, of course, be gleaned only from the form and proportions of the skull, coupled with, in some cases, the marks of the attachments of the muscles themselves. From the analogy of chamæleons, which, although insectivorous, masticate their food, it is inferred that horned dinosaurs had powerful temporal and feeble pterygoid muscles, thereby differing markedly from crocodiles, in which, owing to the absence of mastication, the conditions in these respects are reversed. It is also pointed out that the neck-shield or frill of the Ceratopsia presents a remarkable analogy or parallelism to the so-called casque of the chamæleon's skull, both structures being essentially a backward extension of the parietal segment designed to afford extra space for the origin of the great temporal muscles. It is added that Owen's chamæleon from the Cameroons presents a curious "mimicry" of the Triceratops type in carrying three horns situated very much as in the dinosaur, although these horns are entirely dermal structures, devoid of bony cores. "In the chamæleon they seem to be the result of sexual selection, and are certainly not for aggressive warfare in a creature which moves with the utmost caution; while in Triceratops the presence of efficient weapons in both sexes was an imperative factor in the struggle for existence."

IN the *Travaux de la Société Impériale des Naturalistes de St. Pétersbourg* (vol. xxxviii., part i.) there appear two contributions to the "Flora Caucasica Critica." Mr. N. Kusnezow contributes addenda and a summary of various cohorts allied to the Ericales, and Mr. A. Fomin is responsible for a fascicle on the Campanulatæ.

THE first number of the Proceedings of the Field Club and Natural History Society of University College, Exeter, has been received, in which the inception of the Field Club and records for previous years are chronicled. A list of plant formations on Dawlish Warren is contributed by Mr. J. L. Sager. Mr. J. Stevens supplies a catalogue of Rotifera collected in the Exeter district, among them a new species, *Brachionus sericus*, taken on Hell Tor.

A PAMPHLET dealing with the red-rot of the sugar-cane stem is issued as Bulletin No. 8 from the experiment station of the Hawaiian Sugar Planters' Association. Up to the present this disease, that is ascribed with a tolerable degree of certainty, although not quite definitely, to *Colletotrichum falcatum*, has not been credited with causing much damage in the Hawaiian Islands, so that the account is in the nature of a premonitory warning. Being a wound parasite, the fungus enters readily where the canes have been penetrated by borers, and is liable to be perpetuated by planting of diseased canes. A resistant variety appears to have been found in the yellow Caledonia.

THE short list of new diagnoses, "Decades Kewenses, xxiii.," published in the current number of the *Kew Bulletin* (No. 4), contains Chinese species of Sterculia, Euonymus, and Rheum, also a new Rheum from Tibet. Mr. J. Burtt-Davy communicates some notes on Transvaal trees and shrubs. The group of Acacias is very numerous, and includes the species *caffra, Catechu, Giraffae, horrida,* and *spirocarpoides*, the last-named being a common species of the "umbrella" type in the Waterberg district. Evidence is adduced in favour of referring the Pretoria

"Wonderboom" to *Ficus caffra*. The determination of species in the orders Rubiaceæ, Ebenaceæ, and Celastraceæ is provisional. On the subject of the South African locust fungus, *Entomophthora Grylli*, Mr. G. Massee concurs in the opinion that it does not provide a remedy for exterminating locusts. Mr. T. A. Sprague collates the information regarding the occurrence of rubber in species of Gymnosporia.

MR. R. G. THOMPSON, in the May number of *Man*, describes the ancient gold mines at Gebét, in the eastern Sudan, some eight days' march from Suákim. The works on this site, which is still occupied by miners, consist of an extensive series of underground tunnels excavated with metal tools, such as an iron scraper found in one of the workings. The scanty remains of pottery found indicate that these mines were worked about the beginning of the Christian era. The most noticeable relics are a number of querns of a rude form in which the quartz was ground, the gold being subsequently extracted by the action of water.

IN the April number of the Journal of the Gypsy Lore Society Dr. G. A. Grierson contributes an interesting note on the philology of Romani. The Indian Gypsies, most of whom are of south Indian origin, have little to do with it, although some of them have borrowed words which are closely connected with it. He accepts Prof. Peschel's suggestion that the linguistic home of the Romani is to be found mostly beyond the northern frontier of India, in Kashmir, Gilgit, and Chitral, among the Doms of that region. Their language is one of the Pisáca group, a name which represents an Aryan tribe which reached India from the Pamirs over the Hindu Kush. As they entered the Punjab their speech became partially mixed with those of the other Aryan tribes who entered India from the west, but it can still be traced down the Indus valley into Sind, across Gujarat into the country of the Bhils, and as far as the central Vindhyan range, where it has affected the local dialects of Mahratti.

THE *Australasian Traveller*, the journal of the Commercial Travellers' Association of Australasia, issued as its last Christmas number a richly illustrated folio volume of nearly 200 pages entitled "Australia To-day." It contains accounts of the resources, industries, and attractions of each of the Australian States and of British New Guinea. It directs attention to the enormous value of Australian production, with its output of 474,000,000*l*. of gold and its pastoral and agricultural produce, which together give it a greater output per head of population than any other continent. In addition to a collection of recent statistics, it describes pictorially the working life of the Australians and their industries, and the series of large photographs gives an excellent idea of the varied and beautiful character of Australian scenery.

IT is stated in the *Engineer* of May 29 that in sinking for the sump at the new collieries at Bentley, near Doncaster, where the Barnsley seam was reached six weeks ago at a depth of 624 yards, a further fine seam of coal has been discovered twenty-four yards below the Barnsley seam. It is 5 feet thick, and is known in Derbyshire as the Dunsil seam. Hitherto it has not been found in workable thickness in Yorkshire.

THE new museum of safety devices installed in December, 1905, at the Conservatoire des Arts et Métiers, in Paris, is described by Mr. J. Boyer in the *Engineering Magazine* for May. Its purpose is to indicate the precautions to be taken and the devices to employ to protect workmen against risks of all kinds—unhealthy atmosphere, dangers from machinery, harmful dust, high electric voltages, and poisoning.

THE summary of the weather for the closing week of May, issued by the Meteorological Office, shows that the conditions had generally become more settled and summer-like over the entire country. In the north of Scotland the shade temperature rose to 80°, and almost equally high temperatures occurred generally over the United Kingdom. The spring, covered by the period of thirteen weeks ending May 30, was wet over the entire country, the aggregate rainfall being everywhere in excess of the average. In the north-west of England and in the Midland counties the excess of rain was more than 2 inches, and the number of rainy days was everywhere more than the normal. The temperature for the season was below the average, and there were fewer hours of bright sunshine than the normal. June opened with high summer temperatures, and sharp thunderstorms were experienced on the night of June 1 in most parts of England.

DR. F. EREDIA, of the Meteorological Office at Rome, continues in the Bulletin of the Italian Aëronautical Society his useful discussion of the winds of Italy, for places where trustworthy observations are available for the years 1891–1900. We have received memoirs relating to five provinces, in which he deals with the frequency of wind-direction referred to eight points, for months and seasons, illustrated by diagrams and wind-roses. In all cases the principal results are summarised in an interesting textual discussion.

WE have recently received from Prof. Hergesell a copy of the observations relating to the meteorological service of Alsace-Lorraine for 1903, one of the series of year-books published on a uniform plan by the various States of the German Empire. The tables include monthly and yearly results for a large number of stations, hourly means for Strassburg, and five-day means at fourteen selected places. There is also a valuable appendix by Dr. Kleinschmidt containing monthly and yearly rainfall values for lustra, extending in some cases from 1876 to 1905. Some of these data have been compiled from Dr. Hellmann's great rainfall work and other trustworthy publications.

THE May number of the *Jahrbuch der Drahtlosen Telegraphie und Telephonie* contains two contributions by Prof. J. A. Fleming and Dr. L. Mandelstam, respectively, to the discussion as to the correct deduction and interpretation of Prof. Fleming's formula for the radiation in different directions of the bent antennæ used in wireless telegraphy.

THE *Physikalische Zeitschrift* for May 15 contains an article on the daily variation of the potential gradient in the atmosphere, by Dr. D. Smirnow, of the Central Observatory of St. Petersburg. He shows that the daily variation on clear days may be explained, qualitatively at least, and possibly quantitatively, by the production at sunset of a colder and relatively moist stratum of air in contact with the ground, which, owing to the reduced mobility of the ions and consequent decrease of electrical conductivity, causes positive electricity to collect on the ground, and thus reduces the electric field above the cool layer. At sunrise the layer disappears and the field increases to its former value. During the day the ascending air carries with it positive electricity, leaving negatively charged dust particles behind, and so the field is reduced. The direct action of sunlight in producing negative charges in the upper atmosphere seems to have little effect on the potential gradient near the surface.